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AQUATIC INVERTEBRATES AND HABITAT OF PRICKLY PEAR CREEK,
PARK COUNTY, MONTANA

May 5, 2001

A report to the Montana Department of Environmental Quality

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INTRODUCTION

This report summarizes data generated from a single aquatic invertebrate sample taken near the mouth of Prickly Pear Creek at Burnham, just past the beehives. The sample was collected by personnel of the Montana Department of Environmental Quality (MT DEQ) using the sampling protocol recommended by Bukantis (1998). Analysis of invertebrates was accomplished by applying the method recommended by Bollman (1998) for streams of western Montana. The method uses a multimetric battery to evaluate disturbance to biotic integrity. A thorough description of the analytic protocol and rationale for its application may be found in numerous reports to MT DEQ by this author.

RESULTS AND DISCUSSION

Bioassessment results are given in Table 1. When this bioassessment method is applied to these data, scores indicate that this site on Prickly Pear Creek partially supports designated uses and exhibits moderate impairment. All insect taxa richness metrics performed worse than expected for a valley stream. No sensitive taxa were collected, and the proportions of both filter-feeders and tolerant taxa exceeded expectations.

The taxonomic and functional composition of the sampled assemblage can be further interpreted. Other useful metrics appear in the appendix to this report. One of these is the modified biotic index; the value calculated for this assemblage (5.63) suggests that water quality at this site was impaired. This hypothesis is strengthened by the dearth of mayfly taxa taken in the sample; only 3 taxa were present. Impairment could be due to nutrient and/or organic enrichment. It is less likely that thermal impairment existed at the site, since the midge *Diamesa* sp., which prefers cold water habitats, was abundant at the site.

Habitat disturbances or inadequacies are also implicated in the data. Small-scale habitat disturbance by fine sediment deposition is suggested by the small number of caddisfly taxa (2) and "clinger" taxa (4) present in the sample. Taxa richness (16) is quite low, and only 4 predator taxa were collected, none of which was abundant. These findings suggest a general paucity of instream habitats, perhaps due to monotonous benthic substrate or scouring flows. Reach-scale habitat shortcomings are suggested by the low number of stonefly taxa apparently inhabiting the site. Low stonefly taxa richness can be a correlate of disturbances such as loss of riparian function, channel alteration, or extensive streambank instability.

The dominant taxon collected at the site was the blackfly *Simulium* sp., which overwhelmed the sample, comprising 52% of organisms. Such abundance of this animal could be due to a fortuitous sampling event: blackfly larvae are gregarious, and collecting a large number of them could simply be the result of a chance encounter by the sampler with a large "bloom". In any event, their presence in large numbers at a site does suggest that suspended fine organic particles were plentiful at the site. The functional composition of the benthic assemblage at this site was skewed toward collectors, including both the filter-feeders (primarily *Simulium* sp.) and grazing collectors.

Only a single long-lived taxon was collected at this site, the dytiscid *Oreodytes* sp. Low numbers of semivoltine taxa suggests that seasonal dewatering or other catastrophes may periodically interrupt life cycles at this site on Prickly Pear Creek.

Table 1. Metric values, scores, and bioassessment for a site on Prickly Pear Creek. May 5, 2001. Revised bioassessment metric battery and criteria (Bollman 1998) used for reference.

	Prickly Pear Creek
METRICS	METRIC VALUES
Ephemeroptera richness	3
Plecoptera richness	2
Trichoptera richness	2
Number of sensitive taxa	0
Percent filterers	52
Percent tolerant taxa	12
	METRIC SCORES
Ephemeroptera richness	1
Plecoptera richness	2
Trichoptera richness	1
Number of sensitive taxa	0
Percent filterers	0
Percent tolerant taxa	1
TOTAL SCORE (max.=18)	5
PERCENT OF MAX.	28
Impairment classification*	MOD
USE SUPPORT †	PART

CONCLUSION

- Taxonomic and functional composition of the sample taken at Prickly Pear Creek suggest moderate-to-severe impairment of biotic health at the site. Both water quality degradation, perhaps by nutrient enrichment, and habitat deficiencies on both large and small scales appear to be implicated.

LITERATURE CITED

Bollman, W. 1998. Improving Stream Bioassessment Methods for the Montana Valleys and Foothill Prairies Ecoregion. Unpublished Master's Thesis. University of Montana. Missoula, Montana.

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft, April 22, 1997. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

APPENDIX

Taxonomic data and summaries

Prickly Pear Creek

May 5, 2001

Aquatic Invertebrate Taxonomic Data

Site Name: Prickly Pear Creek

Site ID: At Burnham 5/22/01

Approx. percent of sample used: 60

Taxon	Quantity	Percent	HBI	FFG
<i>Eiseniella tetraedra</i>	5	1.66	8	CG
<i>Fossaria</i> sp.	11	3.64	6	CG
Total Misc. Taxa	16	5.30		
<i>Acentrella turbida</i>	1	0.33	4	CG
<i>Baetis tricaudatus</i>	24	7.95	6	CG
<i>Ephemerella inermis</i>	4	1.32	1	CG
Total Ephemeroptera	29	9.60		
<i>Suwallia</i> sp.	4	1.32	0	PR
<i>Sweltsa</i> sp.	1	0.33	1	PR
Total Plecoptera	5	1.66		
<i>Amiocentrus aspilus</i>	2	0.66	3	CG
<i>Hydropsyche</i> sp.	1	0.33	4	CF
Total Trichoptera	3	0.99		
<i>Dytiscidae</i>	2	0.66	5	PR
Total Coleoptera	2	0.66		
<i>Simulium</i> sp.	157	51.99	6	CF
Total Diptera	157	51.99		
<i>Diamesa</i> sp.	56	18.54	5	CG
<i>Micropsectra</i> sp.	2	0.66	7	CG
<i>Orthocladius</i> sp.	23	7.62	6	CG
<i>Parametriocnemus</i> sp.	7	2.32	5	CG
<i>Thienemannimyia</i> Gr.	2	0.66	6	PR
Total Chironomidae	90	29.80		
	Grand Total	302	100.00	

Aquatic Invertebrate Summary Data

Site Name: Prickly Pear Creek	Site ID: At Burnham	5/22/01	
TOTAL ABUNDANCE	302	CONTRIBUTION OF DOMINANT TAXA	
Ephemeroptera + Plecoptera +		TAXON	ABUNDANCE PERCENT
Trichoptera (EPT) abundance	37	<i>Simulium</i> sp.	157 51.99
TOTAL NUMBER OF TAXA	16	<i>Diamesa</i> sp.	56 18.54
Number EPT taxa	7	<i>Baetis tricaudatus</i>	24 7.95
TAXONOMIC GROUP COMPOSITION		<i>Orthocladius</i> sp.	23 7.62
GROUP	#TAXA	<i>Fossaria</i> sp.	11 3.64
Misc. Taxa	2	SUBTOTAL 5 DOMINANTS	271 89.74
Odonata	0	<i>Parametriocnemus</i> sp.	7 2.32
Ephemeroptera	3	<i>Eiseniella tetraedra</i>	5 1.66
Plecoptera	2	<i>Ephemerella inermis</i>	4 1.32
Hemiptera	0	TOTAL DOMINANTS	287 95.03
Megaloptera	0	SAPROBIC INDICES	
Trichoptera	2	Hilsenhoff Biotic Index	5.63
Lepidoptera	0		
Coleoptera	1		
Diptera	1		
Chironomidae	5		
RATIOS OF TAX GROUP ABUNDANCES		DIVERSITY MEASURES	
EPT/Chironomidae	0.41	Shannon H (log _e)	1.27
FUNCTIONAL FEEDING GROUP (FFG) COMPOSITION		Shannon H (log ₂)	1.83
GROUP	#TAXA	Evenness	0.46
Predator	4	Simpson D	0.26
Parasite	0	COMMUNITY VOLTINISM ANALYSIS	
Collector-gatherer	10	TYPE	ABUNDANCE PERCENT
Collector-filterer	2	Multivoltine	87 28.64
Macrophyte-herbivore	0	Univoltine	214 70.70
Piercer-herbivore	0	Semivoltine	2 0.66
Scraper	0		
Shredder	0		
Xylophage	0		
Omnivore	0		
Unknown	0		
RATIOS OF FFG ABUNDANCES		#TAXA	ABUNDANCE PERCENT
Scraper/Collector-filterer	0.00	Tolerant	3 37 12.25
Scraper/(Scraper + C.filterer)	0.00	Intolerant	0 0 0.00
Shredder/Total organisms	0.00	Clinger	4 164 54.30

